AMENDMENTS TO THE CLAIMS

A detailed listing of all claims that are, or were, in the present application, irrespective of whether the claim(s) remain(s) under examination in the application is presented below. The claims are presented in ascending order and each includes one status identifier. Those claims not cancelled or withdrawn but amended by the current amendment utilize the following notations for amendment: 1. deleted matter is shown by strikethrough for six or more characters and double brackets for five or less characters; and 2. added matter is shown by underlining.

1. (Previously Presented) A method of seismic exploration comprising:

generating a seismic event;

applying the seismic event to a body of water having a sea bottom;

detecting a response to the seismic event within a detection area of the sea bottom from a position spaced apart from the sea bottom, the response including P-waves and S-waves resulting from the seismic event; and

analyzing the response;

wherein:

detecting the response includes monitoring successively each of a plurality of non-discrete, overlapping segments defining the detection area to ascertain in the detection area over a response period and recording a detected response to the seismic event, the response period being a predetermined period of time after the seismic event;

analyzing the response includes analyzing the movements of the particles in the detection area of the sea bottom ascertained during the response period; and

monitoring includes using a monitoring apparatus which is moved relative to the sea bottom during the response period.

2. (Previously Presented) The method of claim 1, wherein monitoring further includes applying successively to each of the plurality non-discrete, overlapping segments defining the detection area light, in the form of visible light, x-rays, UV light or IR light, or another form of radiation including radio waves, radar, sonar or acoustic waves.

3. (Cancelled)

4. (Previously Presented) The method of claim 1, wherein analyzing further includes eliminating from the detected response noise caused by movement of the monitoring apparatus in relation to the sea bottom.

5. (Cancelled)

6. (Previously Presented) The method of claim 1, wherein using a monitoring apparatus includes the step of using a plurality of monitoring devices simultaneously at different locations.

7. (Previously Presented) The method of claim 1, wherein detecting the response further includes:

transforming the response into digital form; and

recording the response in digital form.

8. (Previously Presented) The method of claim 1, wherein analyzing further includes analyzing surface particle displacements, velocities, or accelerations.

9. (Previously Presented) The method of claim 2, wherein using the monitoring apparatus includes directing a source of coherent mono frequency light at the detection area and receiving reflected coherent light.

10. (Previously Presented) The method of claim 9, wherein monitoring further includes using the coherent light and a reference beam to make speckle patterns by means of interferometry and analyzing further includes analyzing the speckle patterns.

11. (Previously Presented) The method of claim 2, wherein using the monitoring apparatus further includes using a video recording apparatus.

12. (Previously Presented) The method of claim 11, wherein using the video recording apparatus includes using one or more cameras operating on a basis of visible light.

13. (Previously Presented) The method of claim 1, wherein applying the seismic event includes applying the seismic event directly to the sea bottom.

14. (Previously Presented) The method of claim 13, wherein using the monitoring apparatus includes locating the monitoring apparatus between approximately 0.5 to 5 meters above the sea bottom during the response period.

15. (Previously Presented) The method of claim 13, wherein using the monitoring apparatus includes using a hydrophone.

16. (Previously Presented) The method of claim 13, wherein analyzing includes eliminating noise representing disturbances caused by the motion of the monitoring apparatus from the detected response, the monitoring apparatus being towed or self-propelled.

17. (Previously Presented) The method of claim 13, wherein monitoring successively each of the plurality of non-discrete, overlapping segments defining the detection area to ascertain the movements of the particles includes monitoring successively each of the plurality of non-discrete, overlapping segments defining the detection area to ascertain the movements of sand particles on the sea bottom.

18. (Previously Presented) The method of claim 13, wherein generating the seismic event includes generating a seismic wave having a wavelength in a range of approximately 5 to 100 meters and a duration of up to approximately 3 seconds.

19. (Previously Presented) The method of claim 13, wherein monitoring over a response period includes monitoring in a range of approximately 4 to 8 seconds.

20. (Previously Presented) The method of claim 13, wherein monitoring using the monitoring apparatus includes monitoring using a plurality of monitoring devices mounted on a plurality of cables, the monitoring devices on each cable being spaced from each other by a distance which is less than the wavelength of the transmitted seismic event.

21. (Previously Presented) An apparatus for carrying out seismic exploration comprising:

a seismic event generator;

a seismic delivery device adapted to apply the seismic event to a body of water having a sea bottom;

a detecting apparatus adapted to detect within a detection area of the sea bottom a response to the seismic event, the response including P-waves and S-waves resulting from the seismic event, the detecting apparatus being spaced apart from the sea bottom; and

an analyzer;

wherein:

the detecting apparatus includes a monitoring apparatus adapted to monitor successively each of a plurality of non-discrete, overlapping segments defining the detection area to ascertain movements of particles in the detection area, over a response period and a recording apparatus adapted to record a detected response to the seismic event, the response period being a predetermined response period after the seismic event; and

the monitoring apparatus is adapted to move relative to the sea bottom during the response period.

22. (Previously Presented) The apparatus of claim 21, wherein the monitoring apparatus is adapted to apply to the detection area light, in the form of visible light, x-rays, UV light or IR light or another form of radiation including radio waves, radar, sonar or acoustic waves.

23. (Previously Presented) The apparatus of claim 21, wherein the monitoring apparatus is adapted to move relative to the sea bottom during the response period.

24. (Previously Presented) The apparatus of claim 21, wherein the monitoring apparatus is capable of being kept stationary during the response period and then moved to a different position after the response period.

25. (Previously Presented) The apparatus of claim 21, wherein the monitoring apparatus includes several monitoring devices which can be used simultaneously at different locations.

26. (Previously Presented) The apparatus of claim 21, wherein the monitoring apparatus includes a source of coherent light arranged to be directed at the detection area and a receiver for reflected coherent light.

27. (Previously Presented) The apparatus of claim 21, wherein the monitoring apparatus includes a video recording apparatus and the recording apparatus is adapted to record a visual record.

28. (Previously Presented) The apparatus of claim 21, wherein the seismic delivery device is adapted to apply the seismic event directly to the sea bottom.

29. (Previously Presented) The apparatus of claim 28, wherein the detecting apparatus additionally includes a hydrophone.

30. (Previously Presented) The apparatus of claim 28, wherein the detecting apparatus is adapted to be towed by a vessel or is self-propelled.

31. (Previously Presented) The apparatus of claim 21, wherein the detecting apparatus includes a plurality of monitoring devices mounted on a plurality of cables, the monitoring devices on each cable being spaced from each other by a distance which is less than the wavelength of the transmitted seismic event.

32. (Previously Presented) The method of claim 1, wherein analyzing includes deriving representations of subsurface layers and assembling the representatives as a depiction of a geological structure of the region.

33. (Cancelled)

34. (Previously Presented) The method of claim 2, wherein monitoring successively further comprises recording successively reflected light in the form of visible light, x-rays, UV light or IR light or another form of radiation including radio waves, radar, sonar or acoustic waves from each of the plurality of non-discrete, overlapping segments defining the detection area.

35. (Previously Presented) An apparatus for carrying out seismic exploration comprising:

means for generating a seismic event;

means for applying the seismic event to a body of water having a sea bottom;

a detecting apparatus adapted to detect within a detection area of the sea bottom a response to the seismic event, the response including P-waves and S-waves in the sea bottom resulting from the seismic event, the detecting apparatus being spaced apart from the sea bottom; and

means for analyzing the detected response; wherein:

the detecting apparatus includes a monitoring apparatus adapted to monitor successively each of a plurality of non-discrete, overlapping segments defining the detection area to ascertain movements of particles in the detection area over a response period and recording apparatus adapted to record a detected response to the seismic event, the response period being a predetermined response period after the seismic event; and

the monitoring apparatus is adapted to move relative to the sea bottom during the response period.